

REMARKS

The courtesies extended to the undersigned by Examiner Kalyan Kumar and by SPE Patrick Mackey, during the interview held November 2, 2007 in the subject U.S. patent application, are acknowledged and appreciated. As discussed during the interview, applicant, his principal representatives in Germany, and the undersigned have carefully reviewed the second non-final Office Action of August 3, 2007 in the subject U.S. patent application, together with the prior art now cited and relied on in the rejections of the claims. In response, the claims have again been amended in an effort to more clearly define the subject invention over the prior art cited and relied on, taken either singly or in combination. Reexamination and reconsideration of the application, and allowance of the claims is respectfully requested.

As discussed during the interview, the subject invention is directed to a device that is usable to align sheets transversely with respect to a sheet receiving direction. This device is in contrast to prior devices, which could register only one sheet at a time, without the sheets being delivered to the sheet support table in a continuous, shingled manner. In the subject device, as recited in currently amended claim 30, a sheet support, generally at 01, includes a side register mark 03. A suction roller 05 is positioned at a fixed distance above the sheet support during transverse alignment of the sheets against the side register mark 03. As was discussed during the interview, the suction roller 05 is height adjustable, with respect to the feed table or sheet support 01, but not during its operation to align sheets transversely. The variation in the height of the suction roller 05, with respect to the first table 01, would be done if the thickness of the sheets being transversely registered were to change. Since the surface of the suction roller engages a sheet to be transversely registered, the thickness of the sheets being registered will require the fixed distance at which the suction roller is positioned above the first web to be changed in accordance with the paper thickness. However, such an adjustment would not take place during operation of the device for aligning sheets.

The suction roller 05 is continuously rotated by a suitable drive motor 17, as seen in Fig. 3. Such rotation is timed or coordinated with the speed at which the sheets being aligned transversely are supplied to the sheet support or feed table 01. As may be seen in Figs. 1 and 2, the suction roller 05 has a plurality of circumferentially spaced sheet holding surfaces, which include suction hole 06. These suction holes 06 in each sheet holding surface segment of the suction roller have both a longitudinal distance and a transverse distance. The longitudinal distance of each such sheet holding surface segment is at least three times as great as the transverse direction. That transverse direction is also less than the circumference of the roller. Successive ones of the sheet holding surface segments engage successive ones of the sheets that are supported on the sheet support. These sheet holding surface segments thus move each one of the successive sheets transversely to the sheet running direction and into engagement with the side register mark.

Claim 69 is the sole method claim now pending in the case. It recites a method for aligning sheets transversely to a sheet running direction, which sheets are supported on a sheet support in a scaled manner. A suction roller is provided and is driven for continuous rotation. The sheets are moved, on the sheet support, under the suction roller so that the suction roller can grip the sheet that is under it and can move it laterally into engagement with sheet side register marks. A first sheet, which has previously been side registered, is being moved away from the side register marks, in a sheet running direction, while the second sheet is being moved into engagement with the side register marks by rotation of the driven suction roller. At the same time, a third sheet is being transported in the sheet running direction on the sheet support. Such movement of the third sheet is beneath the second sheet and occurs while the second sheet is being grasped, from above, by the suction roller.

In the second, non-final Office Action, claims 30-32, 37, 39, 41, 43-46, 48, 49, 52-54, 60, 61, 63, 64, 66, 67 and 69 were rejected under 35 USC 103(a) as being unpatentable over U.S. patent No. 3,178,170 to Peyrebrune in view of U.S. patent No. 4,345,752 to Nakamura and

further in view of U.S. patent No. 4,643,414 to Weisgerber. It was asserted that Peyrebrune shows a sheet aligning device having a feed table with a side register mark and a roller positioned above the sheet support surface. It was admitted in the Office Action that Peyrebrune does not show the roller being a suction roller with a sheet holding surface segment on its circumference; does not show a longitudinal distance to transverse distance ratio of greater than 3 and does not show means for rotating the cylinder for less than one revolution for moving each sheet against the side mark. Peyrebrune was also acknowledged as not having first and second spaced suction hole segments with each such hole segment being adapted to exert a suction pull on a separate one of the plurality of sheets.

The secondary reference to Nakamura was relied on as showing a suction roller with sheet holding surface segments. This secondary reference was also asserted as showing a longitudinal distance of the roller being greater than a transverse distance of such sheet holding surface section. It was further asserted in the Office Action of August 3, 2007 that the device was usable to exert a suction pull on a separate one of a plurality of sheets to be subsequently aligned against a side register lay.

The Weisgerber reference was relied on to teach a longitudinal distance of a sheet holding surface segment of a roller being greater than a transverse distance of that sheet holding surface segment by a ratio greater than 3. It was asserted that the combination of these three references would render obvious the apparatus and method of operation recited in the claims then pending in the application.

As discussed during the interview, there are a number of reasons why the combination of references advanced by the Examiner in the rejections of the claims would not, in fact, render the claims obvious to one of skill in the art. It is also submitted that the several references cited by the Examiner are not combinable because their fields of usage are quite different from each other.

Initially, it is to be noted that independent claim 33 has been amended to now be a dependent claim. It now depends from believed allowable, currently amended claim 30. Since claim 30 is the sole independent apparatus claim now pending in the subject application, the bulk of the discussion of the rejection of the apparatus claims will be directed toward it.

As pointed out during the interview, the Peyrebrune patent shows a side registering mechanism in which each sheet A, as seen in Fig. 1, which is supported by an underplate 16, is moved into engagement with a side register mark 62 by the cooperative motions of an underlying segment 18 and an overlying drop roller 28. These contact the lower and upper surfaces of a sheet through a small rectangular opening 19 that is seen only in Fig. 3. The segment 18 is caused to be driven, in a back and forth manner, by a box cam 26 and a roller 22, as may be seen in Fig. 3. The drop roller 28 oscillates up and down, as seen in dashed lines in Fig. 1, by a cam 15, as seen in Fig. 2. The segment 18 and the roller 28 move toward each other and then away from each other, in a repeating manner, to periodically grasp a sheet, from above and below, and to move that sheet into engagement with the side marks 62.

In the Peyrebrune device, the drop roller 28 is not driven. It continually moves toward and away from the segment 18. It is not held at a fixed distance from the sheet support at any time during its operation. The specific dimensions of the roller of Peyrebrune are not given. Since Fig. 1 is an end view of roller 28, it cannot be determined, from that view, the length of the roller 28. However, by referring to Fig. 3, it can be seen that the longitudinal length of the roller 28 cannot be any greater than the width of the rectangular opening 19. Otherwise, the surface of the roller 28 could not cooperate with the surface of the segment 18. While it is understood that patent drawings are not scale drawings, it is clear that the longitudinal distance of roller 20 cannot be at least three times the transverse distance of a sheet holding surface segment, if Peyrebrune were to be modified to have such a sheet holding surface signal.

The secondary reference to Nakamura is not directed to a sheet side registering device and is thus not readily understood as being combinable with the primary Peyrebrune reference.

Nakamura is directed to a sheet transport apparatus. As may be seen most clearly in Fig. 1, a stack of cards are held in a case 21. A suction drum 29 is used to lift leading ends of uppermost ones of the cards out of the stack of cards 25, and to feed that leading end of the uppermost card to a pair of cooperating feed belts. While Nakamura does show a drive for the suction drum 29, does show spaced peripheral zones that are used to engage the cards, and does show an interior suction pipe with a slit, it still fails to show a number of the features of the subject invention, as recited in currently amended claim 30.

In the Nakamura device, the suction drum 28 operates by stopping and starting. In that regard, note the discussion at Column 8, lines 14-18. It stops to pick up the leading end of one of the cards in the stack, and then starts to rotate again. As it does pick up the top card in the stack, it is apt to also pick up several other cards that are lying just below the top card. To insure that only one card at a time is transported to the belt conveyor assembly, there is provided a separation suction device 26. This device applies a suction force to the additional cards lifted off the top of the stack by the suction drum 29 and retains them in the stack, as can be seen in detail in Fig. 4.

The ratio of longitudinal distance to transverse distance of the suction area of Nakamura also does not teach or suggest the structure of the subject invention. As discussed during the interview, that ratio is selected to insure that the suction roller of the present invention will move the sheets transversely to the sheet running direction without skewing them. With a roller such as is shown in either Peyrebrune or Nakamura, it is quite likely that a sheet which is being moved transversely to its sheet running direction will be skewed. This is because the length of the sheet holding surface segment is not sufficient to prevent such skewing. Even if the Nakamura device were combinable with the Peyrebrune device, the resultant structure would still not render obvious the structure of the present invention, as recited in currently amended claim 30.

The secondary reference to Weisgerber also does not add any teachings of value to the Peyrebrune reference. As noted during the interview, the Weisgerber patent discloses a sheet feeding device which, as may be seen in Figs. 1-7, uses a feeder chain 1 to transport sheets of paper, such as sheet 41, to a bin 29 where the falling sheet 41 is received on the top of a sheet of sheets 39. As the sheet gripper bars 2 pass over the bin 29, they release the leading edge of the sheet. Once the sheet has been released, it falls into the bin and its front edge engages a paper stop 30. If the front edge of the sheet 41, which is falling onto the top of the stack 39 is released too soon, or too late, by the gripper bars 2, it will not fall into its proper location on the stack. A pair of suction wheels 14 are placed adjacent a rear wall of the bin. These suction wheels 14 can be controlled in their speed of rotation and can thus accelerate the sheets, if the sheets were released too early, or can brake the sheets, if the sheets were released too late. The structure of the suction wheel itself is seen most clearly in Figs. 8 and 9. As depicted in Fig. 9, each suction roller or wheel 14 clearly has very little longitudinal distance and appears to have suction holes around its entire periphery. It clearly cannot have the longitudinal distance to transverse distance ratio recited in currently amended claim 30. If anything, the ratio would be the inverse of that recited in claim 30 wherein, in the Weisgerber device, the transverse distance would be greater than the longitudinal distance.

From the above discussion, it is quite clear that currently amended claim 30 is not rendered obvious over the combination of references cited and relied on by the Examiner. The Peyrebrune drop roller is not driven, is not fixed in place, does not have sheet holding surface segments and does not have a longitudinal distance sufficient to meet the ratio recitation of claim 30. Nakamura and Weisgerber are non-analogous devices since neither is directed to a side registering machine. Neither has a suction roller having the longitudinal distance to transverse distance ratio as recited in claim 30. Neither is usable to move a sheet transversely to its sheet travel direction. Neither can allow the operation of its device with successive sheets.

All of the remaining apparatus claims depend, either directly or indirectly from believed allowable, currently amended claim 30. They are also thus believed to be allowable. While various ones of the features recited in these dependent claims may be disclosed in one or another of the references, they are rendered patentable by their dependence on believed allowable, currently amended claim 30.

Independent method claim 69 has also been amended to further define its recited invention over the prior art references cited and relied upon, taken either singly or in combination. Claim 69 recites that there are at least three sheets situated in a scaled fashion on the sheet support in a sheet running direction. The driven suction roller is rotating in a continuous manner above the sheet support table. As a first sheet is moved out of registration with the side system marks, the suction roller is grasping a second sheet and is moving it into engagement with the side register marks. As the same time, a third sheet, which is supported on the sheet support, is being moved in the sheet running direction beneath the second sheet, while that second sheet is being moved transversely to the sheet running direction. This method of aligning sheets transversely to the sheet running direction affords a continuous side registration of sheets instead of an intermittent side registration of sheets, as was done in the prior art devices, such as in the Peyrebrune device. As discussed in Peyrebrune, each successive sheet can only be fed into place once the roller 28 has been lifted. While the roller 28 is in its lowered position, as is required so that it can cooperate with the segment 18 to move a sheet into engagement with the side register mark 62, a subsequent sheet to be side registered, cannot be moved into place.

Neither of the secondary references are relevant to the method set forth in currently amended claim 69. As discussed above, Nakamura is directed to a sheet transport device which operates in an intermittent fashion. Weisgerber is directed to a sheet braking or accelerating device whose purpose is to insure that a sheet falls down onto the top of a sheet stack in the

appropriate position. It is thus clear that currently amended claim 69 is not obvious over the combination of references cited and relied on by the Examiner.

The various additional references cited in the Office Action of August 3, 2007, but not relied on in the rejections of the claims, have been noted. Since they were not applied in the rejections, no discussion thereof is believed to be required.


SUMMARY

The claims now pending in the subject U.S. patent application are believed to be patentable over the prior art cited and relied on, taken either singly or in combination. Allowance of the claims and passage of the application to issue is respectfully requested.

Respectfully submitted,

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